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Mildews of Indiana.

J. N. ROSE.

The following mildews were collected in the vicinity of Wabash College during the past season. It is not presumed to be a complete list, but merely a beginning, which it is hoped may lead to the cataloguing of all the species of the state. I have also listed the hosts upon which they were found, mentioning those plants which, as far as could be learned, had not before been reported as hosts. This is the first attempt made in this state to determine the various species of this group. The list comprises 11 species and 29 hosts, which have been preserved in the herbarium of the college.

I have followed in the specific descriptions Cooke's "Handbook of British Fungi," Bessey's "Erysiphei of the United States," and "Earle's Podosphæra,"[1] and have used to good advantage in collecting hosts Trelease's "Parasitic Fungi of Wisconsin." Such notes have been added as have come under my own observation, and when the description has not been complete I have added other characters and pointed out differences. These, it is hoped, may be of use in an early revision of some of the ill-defined species.

1. *Uncinula circinata* C. & P.

On leaves of Red Maple. While the perithecia are quite large, .14mm. in diameter, they do not equal those found by Bessey on the Silver Maple. Asci only from 8 to 10.

2. *Microsphæra Friesii* Lév.

Very abundant on the leaves of the Lilac. Common everywhere.

3. *Microsphæra Russellii* Clinton.

Found abundant on leaves and stems of Oxalis stricta, especially on plants growing in moist, shady places.

4. *Microsphæra Platanii* Howe.

On leaves of Sycamore. Common.

5. *Microsphæra Grossulariæ* Lév.

On Sambucus Canadensis. As far as I can learn, this is the first time this species has been found on the Elder in this country. Cooke gives it as a host in his Hand Book. Farlow mentions the Elder as the host of M. Hedwigii; while Trelease gives it for M. VanBruntiana. While our specimen does not correspond very well with the description given by Bessey for M. Grossulariæ, yet it is more like this than either of the two species just mentioned. The following characters more nearly describe our specimens: Perithecia scattered on both sides of the leaf, globose, minute, .07–.09mm. in diameter. Reticulations prominent. Appendages 10 to 15, prominently dichotomous, 4 to 6 times branched and spreading, clear throughout their length; spread of branches equal, exceeding the diameter of the perithecia; ultimate branches often quite long, tips blunt. Asci 3–7, ovate, containing from 3 to 4 spores.

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[1] Botanical Gazette, IX. 24.

6. *Podosphæra oxacantha* DC. (P Kunzei Lév. P tridactyla Wall.)

On the Persimmon and Quince. Bessey gives P. Kunzei, while Trelease adheres to tridactyla. In this species we follow Earle, who has carefully worked out the literature of the subject and has made a special study of this genus. See BOTANICAL GAZETTE, Vol. IX, p. 24. Neither of the above hosts are mentioned in any of the reports which I have at hand. The Persimmon is the first host outside of Rosaceæ upon which this species has been found. The perithecia, however, are few and scattered. All the asci which I examined contained 9 spores, differing in this respect from any of the species of Podosphæra. The description of this species by Cooke is not at all adequate. The description of Earle more nearly includes it. The specimen from the Quince gives the following characters: Amphigenous, fruiting on both sides of the leaf, abundant especially on the upper side. Perithecia dark brown, .08mm. in diameter. Appendages about as long as the diameter of the perithecia, 5 to 16, colored for more than half their length, 3 to 4 times branched.

7. *Phyllactinia suffulta* Reb. (P. guttata Lév.)

On leaves of Dogwood and Hazel; very abundant on the latter.

8. *Sphærotheca Castagnei* Lév.

On Taraxacum Dens-leonis, Bidens frondosa, B. chrysanthemoides, Hieracium, Lactuca, Erigeron. All of these, excepting the first two, are new hosts. Cooke's description is not sufficient to include all these forms. I make the following notes from our specimens: Mycelium often abundant, web like, and commonly persistent. Perithecia globose, very minute, but varying in size, .07 to .10mm. in diameter, on both sides of the leaves and often on the branches and stems, abundant in patches. Appendages equalling or exceeding the diameter of the perithecia. Ascus with few spores, generally 8.

9. *Erysiphe tortilis* (Wall.) Lk.

On Clematis Virginiana. Our specimens are amphigenous, as given also in Bessey's notes. Spores generally 4, often 5 and 6. With these two exceptions the description of Cooke corresponds with our specimens. The plants on which this mildew were growing were in a very sickly condition.

10. *Erysiphe lamprocarpa* (Wall.) Lév.

On Cnicus altissimus, var. discolor, Verbena urticifolia, Ambrosia artemisiæfolia, Helianthus doronicoides, H. annuus, Actinomeris squarrosa, Vernonia fasciculata, Eupatorium perfoliatum, Solidago Canadensis. This is one of our most common and best known mildews. The conidial stage occurs in the early part of summer and lasts until fall. The mycelium is generally very abundant, covering the foliage with a whitish web-like mass. The last six hosts are not given in any of the lists to which I have had access.

11. *Erysiphe communis* (Wall.) Schl.

On some Anemone and Ranunculus abortivus. Our Anemone specimens give the following points: Perithecia abundant on petiole and blade above and below, very dark brown. Appendages 10 to 15, sometimes very long, lower half slightly colored, tips clear. Asci 3 to 4: spores 3 to 5, mostly 4. Perithecia quite variable in size, reaching .11 mm. in diameter. This host plant was found growing in a patch of Ranunculus abortivus which had this mildew upon it, and from which it had probably spread to the Anemone. In the Ranunculus specimen I noted asci from 2 to 6, with spores ranging from 4 to 6.

Three other species were reported in the laboratory last year, but as the specimens were not preserved I could not verify the work, and so dispose of them as nearly as possible from the meager descriptions in the laboratory notes at hand.

Uncinula Americana Howe.

On the leaves of the grape.

A species found on the Elm, and doubtless belonging to the genus Uncinula, is given, but does not come under any of the three species assigned to this host as given by Bessey. The notes give number of asci 10 to 12; spores 5. C. H. Peck is the only one in this country who has reported finding this mildew on the Elm, and hence I judge it must not be a very common form. After a most searching examination of many leaves I was compelled to give up without finding a single perithecium.

The species reported from the Beech is probably *Phyllactinia suffulta* Reb., as Cooke says it is commonly to be found here.

A species was found by me growing abundantly on Poa pratensis in November and again late in December. This Bessey calls *Erysiphe communis* Schl., while Trelease assigns it to *E. graminis* DC. As yet only the conidial phase has been studied and finding of perithecia will be necessary to positively decide the species.

BRIEFER ARTICLES.

Aspidium Oreopteris Swz.—The only American station hitherto recorded for this species has been the Island of Unalaska, where it was discovered by Mr. L. M. Turner in 1878, but by the past season's searches of that indefatigable worker, Professor Macoun, Naturalist of the Geological Survey of Canada, it is now located on the North American continent proper, and no less than about 1,600 miles east of the former station. It was found August 22, 1885, on Mount Dawson, at the summit of the Canada Pacific Railway pass through the Selkirk Range, British Columbia, a little south of lat. 51°. The patches, which were fairly abundant, grew on a comparatively dry slope of the mountain, at an altitude of 6,500 feet, or a little less, and also in wetter soil and at a greater altitude, on a neighboring mountain, the upper slopes of which were covered by a glacier.

The fronds of the Canadian plants are narrower and more graceful looking, both as a whole and in all their parts, than those of the Unalaskan and most European forms, but Professor Eaton, to whom a specimen was sent, writes me that he has one from Mettenius which is as narrow and slender as these. The largest of the specimens received from Mr. Macoun has fronds 1½ feet high, of which 3½ inches forms the stalk, while the middle pinnæ are only 2¼ inches long. The segments, the basal ones of which are often large in proportion to those next them, are but little more than a line in width, and the under surface is but very slightly glandular.—T. J. W. BURGESS, M. D., *London, Ontario, Canada.*

A Cheap Camera.—A good substitute for a more expensive camera-lucida for the microscope can be made as follows:

Cut a piece of thin metal, brass or copper, or even tin will do, in the form of a letter L. After smoothing the edges, bend one limb into an unclosed band, to clasp the end of the eye-piece after the cap is removed. Clasp the other limb near its juncture with the ring, with a pair of pliers, and twist it on its own axis through an angle of 90°. On the outer end bend a cock-eye to hold a piece of wood, in the end of which make a slight split and insert the edge of a cover-glass to serve as a mirror. Of course both the image and the pencil-point are seen by looking through the glass, the former by reflected and the latter by transmitted light. The light reflected is sufficient to give good definition when ordinary powers are used. In this way each member of a class can easily make a camera for himself.